

TWENTY YEARS OF ENVIRONMENTAL HEALTH RESEARCH

A Dedication to David P. Rall

Director, 1971–1990

National Institute of Environmental Health Sciences



David P. Rall, M.D., Ph.D
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Introduction

by Kimberly Thigpen

ENVIRONMENTAL HEALTH PERSPECTIVES, the journal of the National Institute of Environmental Health Sciences, was first published as an experimental journal in April of 1972. The function of the NIEHS is to conduct and support basic biomedical research on the effects of various environmental agents and conditions adverse to human health and to inform the Federal and scientific community of possible health hazards associated with such environmental agents. For the last twenty years ENVIRONMENTAL HEALTH PERSPECTIVES has been the vehicle by which this has been accomplished. Prior to the founding of the journal, Dr. David P. Rall, then Director of the NIEHS, recognized the need for the publication of research findings and commentaries on topics in the field of environmental sciences. In his request for authorization to experiment with publication of the journal Dr. Rall set forth the goals and ideals of the journal which have remained both timely and expedient: to provide a forum for early publication of findings which might have broad impact due to the ubiquity of so many constituents of the human environment; to provide a forum for concentrated exploration of the context and perspective of basic research on such environmental constituents; to provide a focus which indisputably covers those aspects of basic environmental research which have human health implications; and to provide a medium for dissemination and exchange of adequately documented negative findings on these topics. It is in a continuing effort to remain true to the spirit and vision of these goals that we publish Volume 100 as a series of perspectives on some of the topics that have predominated in the arena of environmental health sciences in the last two decades. We believe it most fitting to dedicate this volume to a man whose career in the field of environmental science reflects a lifetime commitment to the development of a network of interdisciplinary approaches to the issues of environmental health. Through his work as scientist, statesman, diplomat, and visionary, Dr. David P. Rall has pioneered the effort to identify and understand the elements that make up the human environment and their consequences for human health. Thus it is with a retrospective of Dr. Rall's career and contributions that we preface this volume, for in examining the last 20 years in the evolution of environmental sciences we find the two inextricably interwoven.

A native of Naperville, Illinois, Dr. Rall received his undergraduate degree from North Central College in Naperville, Illinois in 1946. He went on to receive a Ph.D. in pharmacology and an M.D. degree from Northwestern University in Evanston, Illinois, which honored him with the Alumni Merit Award in 1988. Dr. Rall interned on the Second Medical Division of Bellvue Hospital in New York City. He began his research career as a scientist in the Laboratory of Chemical Pharmacology at the National Cancer Institute (NCI) and later served as Chief of that laboratory from 1963-69. In 1955 Dr. Rall moved to the Clinical Pharmacology and Experimental Therapeutics Service, General Medicine Branch at NCI, where he served as both scientist (1955-1958) and head (1958-1963). In 1963 he became Chief of NCI's Laboratory of Chemical Pharmacology, a position he held until 1969 when he became Associate Scientific Director for Experimental Therapeutics. Concurrently, the United States Public Health Service also benefitted from Dr. Rall's contributions as a Surgeon (1955-1959), Senior Surgeon (1959-1969), Medical Director (1963-1971) and Assistant Surgeon General (1971-1990). During his almost 20-year career on the scientific staff of the National Cancer Institute, Dr. Rall authored over 100 publications in the areas of comparative pharmacology, cancer chemotherapy, the blood-brain barrier, the blood-cerebrospinal fluid barrier, pesticide toxicology, and drug research and regulation. He is remembered by Dr. Donald Frederickson, former Director of the National Institutes of Health (NIH), for "his intense and seemingly single-minded dedication to therapeutics in cancer." After 20 years of recognized accomplishments, Dr. Rall had reached what might seem to be the apex of most scientists' careers. However, by the early 1970s, political, social, and scientific forces had all begun to combine to direct Dr. Rall toward what many consider to be the most significant work of his career, the development of the National Institute of Environmental Health Sciences.

The late Dr. Irving J. Selikoff, Professor Emeritus at the Mount Sinai Medical Center and a longtime colleague of Dr. Rall, described the evolution in scientific thinking which preceded the development of environmental science:

Hints began to appear that exogenous agents, generally inorganic, such as metals, dust, chemicals, might be responsible [for disease] and that such influence could be identified, understood and, perhaps, that information used for prevention and management. Around 1970, both the scientific and general community began to consider that cancer, in almost all cases, was the result of environmental factors and was thereby not necessarily inevitable and potentially preventable.

This change in scientific thought and social attitudes was fostered in large part by the book *Silent Spring* by Rachel Carson, published in 1962, in which Carson described the adverse health and environmental effects of pesticides and questioned the "whole attitude of industrial society toward the natural world." In response, as Dr. John A. Moore states, "[P]eople began to view their environment as something they shared with the rest of the members of the ecosystem Although little was definitely known at the time, a nation began to ask itself some environmental questions and to appreciate the need for answers to legitimate concerns." In June of 1970, a nation on the brink of a new environmental consciousness celebrated Earth Day, and in that same year the Environmental Protection Agency (EPA) came into existence and was given the authority to regulate in the interest of public health.

Pesticides were not the only environmental health concern; throughout the decade issues were raised and events occurred which fueled the public and scientific outcry for increased attention to environmental concerns and the need for scientific investigation in these areas. Health concerns involving Agent Orange, its component herbicides, and the contaminant dioxin, especially the 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD), arose out of their use by the government as a defoliant in the war in Vietnam and the subsequent claims by Vietnam veterans of its adverse health effects, including cancer, on those exposed to it. In 1978, the Love Canal disaster, in which chemicals from a chemical-waste-disposal site leached into a residential area, captured the attention of the world and very literally brought home to the public the consequences of indiscriminate dumping of toxic waste. Finally, on March 28, 1979, the accident at the nuclear power plant at Three Mile Island awakened the public consciousness to the heretofore little-publicized dangers of nuclear technology and touched off an antinuclear power crusade which continues in full force today.

As these questions and concerns arose, a nation was confounded by its inability to obtain answers due to the lack of scientific information available concerning the effects of various agents on human health and the environment. It soon became evident how difficult it is to rationally discuss such increasingly emotional issues absent clearly defined scientific knowledge. Ms. Jacqueline Simon, a former policy coordinator covering environmental issues for the department of Health, Education and Welfare (HEW), describes this period as one in which, "science and sunshine had to be brought into closed, inbred decisionmaking processes that had compounded some harrowing public concerns." In an attempt to respond to this increasing need for public and private attention to environmental health problems, the Public Health Service and the Committee on Environmental Health Problems recommend, in 1961, the establishment of a national center to undertake integrated research and other activities related to environmental health. This center became the forerunner of the NIEHS, and it was through his role as its director that Dr. Rall became one of the leaders in the search for credible, reliable environmental science on which the public could base its decisions regarding these complicated environmental health issues.

The Surgeon General announced, on January 7, 1965, that Research Triangle Park, North Carolina, would be the location of a national environmental health sciences center. In April

1965, a group from the National Environmental Health Advisory Committee recommended to the Surgeon General that the proposed center be operated directly by the Public Health Service. The Surgeon General subsequently announced the establishment of the Division of Environmental Health Sciences within the National Institutes of Health. By January of 1969, the Secretary of what was then the Department of Health, Education and Welfare, Wilbur Cohen, elevated the Division to an Institute. Dr. Paul Kotin was named as the Institute's first Director and proceeded with his goal of obtaining excellent scientific research in this emerging field by developing a strong cadre of scientists and administrators to carry it out.

On March 1, 1971, Dr. Rall left the thriving, established world of research and clinical treatment at the National Institutes of Health's main campus in Bethesda where he was serving as Associate Scientific Director for Experimental Therapeutics. Armed with a desire to reach beyond the treatment of chronic diseases to seek controllable, underlying causes in general populations, and through research to learn how to prevent such diseases caused by environmental agents, Dr. Rall arrived in the newly established Research Triangle Park in North Carolina. There he set about the work of conceptualizing and then actualizing a state-of-the-art research facility among the pine forest and pastureland of the area; a seemingly incongruous setting which was perhaps most appropriate for a center that would be devoted to environmental health research.

When Dr. Rall first arrived at NIEHS, the site donated to the Government for development of permanent research facilities was still without structures. Less than a half mile away, the Institute began its working life in a group of one-story temporary and red brick buildings that would later make up its North Campus. These were quickly outfitted to provide laboratories, offices, and support services for the rapidly expanding staff. Soon planning money was allocated for the Institute's South Campus site, and many hours of planning sessions and interviews with scientists and administrators, most of which were personally guided by Dr. Rall, evolved into architects' plans and scale models of the proposed new buildings. In February 1977, the first construction began on the state-of-the-art 334,000 square foot multitower laboratory and office facility, with support services center to provide services and utilities. Dr. Frederickson, then Director of NIH, remembers this period of NIEHS history:

I inherited David as one of the circle of Institute Directors and we rather quickly became better acquainted. He was holding an institute together in makeshift trailers, waiting impatiently for construction of permanent buildings. Tirelessly moving back and forth between Raleigh-Durham and Washington he had to carry an office in his bag. For him it was the building of not only a campus, but a new science.

Although the facilities were not officially dedicated until 1982, the work of the NIEHS, which was entrusted with the principal responsibility among Federal agencies for the support of research and training of research manpower concerned with the effects of chemical, physical, and biological factors on human health, began long before then. A vigorous Intramural Research Program evolved to study the biological effects of environmental agents. In the early 1970s, Institute scientists conducted some of the important early studies of the environmental contaminants known as aromatic hydrocarbons, such as polychlorinated

biphenyls (PBBs), dibenzodioxins, and dibenzofurans, among others. Major studies on heavy metals in the environment soon evolved, as did studies of specific target organs and how they were affected by contaminants.

The success of these programs was made possible by the efforts and expertise of Dr. Rall in two specific areas. The first was his talent of assembling the best and brightest minds he could find to perform the research and then leading by the example of his own dedication to environmental science. This ability, recalls Dr. Ellen Silbergeld of the University of Maryland Program in Toxicology,

was one of the hallmarks of Dave Rall's genius as NIEHS Director. He fostered productive interactions between state-of-the-art science and critical needs in the public policy of environmental health. Time and again, Dave has sensed the cutting edge of this interaction and he has plucked us from laboratories and agencies around the world to brainstorm over RTP barbecue. By anticipating the next crisis in environmental policy, he has prepared us all to meet it with reduced anxiety and acrimony; at the same time, he has defined again and again the critical gaps in research and inspired a generation of scientists to get the interdisciplinary training to fill those gaps.

Of particular note is Dr. Rall's ability to attract world-class scientists to government-sponsored research, a task of increasing difficulty in a time of government cutbacks and expansion in industry salaries. His leadership style has been described as "demanding and inspiring" and he is credited especially by Ms. Joan Z. Bernstein, former General Counsel for DHHS, as being particularly responsive to the position of women, both as scientists and in other positions of authority. Dr. Rall's contributions, as both director and leader, are perhaps best summarized by Ms. Jacqueline Simon, longtime colleague and friend of Dr. Rall's, when she says, "Dave's career reflects his bedrock belief in a scientific process that lets great minds wander, and his effectiveness in bringing that science to bear for the public health."

The efforts of Dr. Rall have greatly benefited the Institute in a second arena as well, the Congressional battle for funds. Dr. Devra Davis, of the National Research Council, recalls that Dr. Rall was "feared and dreaded for his ability to corner the market on appropriations." Dr. Rall's prowess in this arena was due in part to an early alliance which he forged with Congressman David Obey, a member of the Labor/HEW Appropriations Subcommittee. Congressman Obey recalled first meeting Dr. Rall on what happened to be his first day as a member of the subcommittee, when Dr. Rall testified as to the effects of asbestos on workers during World War II. Because Obey had himself worked with asbestos, his interest in workers' health was spurred. The result was a lasting and mutually beneficial relationship. Dr. Rall was dealing in areas not generally understood by the general public or by Congress, and he needed to find people on the subcommittee who would take an interest in the science and expand their knowledge of environmental health. He found such a person in Congressman Obey. Conversely, the subcommittee was faced with justifying the funding of environmental health science which was epidemiologically different from previous public health studies and also found threatening by industry; according to Obey, they needed someone well-suited to laying out the technological differences in this type of research "who could speak in plain English so technical terms could be understood by laymen." Dr. Rall became that man. Years later, Dr. Rall is regarded by Congressman Obey as,

One of the most valuable people to testify before the committee, not only because of his personal style, but because [his work] addressed a new generation of problems, in a political arena, as they related to science. Most importantly, he is a very good scientist who never forgot that behind the science was the goal of improving the human condition."

Simultaneously, with the development of a strong Intramural Research Program, the Extramural Program developed the staff and expertise to administer an expanding portfolio of Public Health Service grants and awards in the environmental sciences to researchers at colleges and universities throughout the United States. The establishment of the multidisciplinary NIEHS University Based Research Centers has allowed for change in the fundamental approaches to the complicated problems of environmental health sciences and provided a mechanism for focusing the resources of the academic community on the search for solutions. Dr. William G. Thilly, Director of the MIT Center for Environmental Health Sciences, credits this direction as coming from "the top of the Institute," and further states, "Rall's recognition of the need for such multidisciplinary research set the mood for successful program projects and then center grant proposals." Dr. Rall's progressive vision is illustrated by Dr. Thilly who recalls an instance when,

several university representatives were called together to discuss the directions that research sponsored by the Superfund Basic Research Program might take, guided by the dynamic duo of Norton Nelson and Dave Rall. Congress had specifically mandated a cross-disciplinary program format. At the meeting a general strategy was put forward which might charitably be called 'cautious' but was more reasonably described at the time as the 'same old stuff.' Somehow Rall and his extramural staff found a way to make sure that a generous portion of innovative proposals got funded while keeping peace in that part of the university community with more traditional approaches. Rall recognized the need for the radical element, in which we at MIT represented a not insignificant fraction, and we appreciated it.

As the Extramural Program expanded, it encompassed grants to environmental health science centers, marine and freshwater biomedical centers, training programs, and other career development programs, one of the most important of which was the NIEHS Hazardous Waste Worker Health and Safety Training Program. NIEHS was chosen to provide the development of a program of education and training designed to prevent exposures to hazardous substances by workers at the many thousands of dump sites and company facilities in the United States. Mr. Donald Elisburg of the Center to Protect Workers' Rights was involved in the creation of the program and says, "The particular significance of these efforts was a notion that the workers involved in cleaning up our polluted society were entitled to at least the same level of protection as those in the surrounding community." NIEHS assisted a number of institutions in developing experimental training programs for these workers. Mr. Elisburg recalls that this was a unique effort:

[The project] was not quite your normal epidemiological or other scientific study. Because it was unorthodox, it didn't fit within the exact framework of the NIH grants and the precise protocols and agency technical jargon. But for Dr. Rall's perseverance, the efforts could have easily led to disaster, confusion and anger over an agency trying to fit the proverbial square peg into the round hole. It is my own feeling that Dr. Rall personally decided that NIEHS had to work the shape of the hole to fit the shape of the peg and to provide a program of fiscal integrity and substantive responsibility off the ground, in an atmosphere that was strange to all participants. The fact of the matter is that this training program has become a singular success for not only the Superfund program in the United States, but has in fact developed into the model of how workers will have to be trained for this kind of work well into the next century.

Although Dr. Rall is renowned for his role in the Institute's evolution from a small nucleus of people with large ideas to a preeminent center for environmental health sciences research, perhaps his most remarkable and certainly most recognized legacy is the development of the National Toxicology Program (NTP). The NTP, established in 1978, is a cooperative effort to coordinate toxicological testing programs within the Department of Health and Human Services. The major objectives of NTP are to increase the depth of knowledge about the toxicology of chemicals, to evaluate the full range of toxic effects of chemicals, to develop and validate new more effective assays for toxicity, and to disseminate toxicological information resulting from its studies. Dr. Donald Frederickson recalls Dr. Rall's role in the formation of the NTP:

The most important task that I ever worked on with David Rall was the forging of the National Toxicology Program from a molten mixture of funds, facilities and tension between powerful agencies. The fire had been started by Congressman David Obey's unrelenting criticism of the NCI's use of its unique appropriation for toxicity testing, and the complaints of the Environmental Health Agency and the Food and Drug Administration of neglect of their needs for toxicity data. Challenged to merge the special interests of leaders like Vincent DeVita [then Director of the NCI] (who had all the money), Donald Kennedy (whose FDA had a vacant facility in Arkansas needing employment), Douglas Costle [EPA Administrator] (who was a lawyer-administrator driven by Congress to beg for scientific data), and David Rall (whose Institute had a mandate but inadequate recognition of it), I boldly proposed one day, in the argumentative atmosphere of a meeting at HEW, the creation of a "National Toxicology Program." Secretary Joseph A. Califano, Jr., skeptically challenged me to back this boast. My secret weapon, acquired in advance, was the agreement of David Rall to take leadership of this new amalgam if we could bring it off. When the NTP at last came about, it was David's management and prestige that assured its success beyond anyone's imagination.

In 1978, Secretary Califano designated the NIEHS as the focal point for the establishment of the NTP and Dr. Rall, Director of NIEHS, was given a simultaneous appointment as its director. Administrators from the regulatory agencies — the Environmental Protection Agency, the Food and Drug Administration, the Occupational Safety and Health Administration, and the Consumer Product Safety Commission — were appointed to sit on the Executive Committee of the NTP, so that all phases of NTP activities relate to the needs of these agencies. In order to best serve the NTP, Dr. Rall organized resources and personnel within NIEHS into the Division of Toxicology Research and Testing, which is devoted to the fulfillment of the NTP mission.

The work of the NTP, says Dr. Devra Davis, set a course of research for animal testing which will extend into the twenty-first century and increased the scientific credibility of the "toxicological paradigm" by the use of the tools of statistical significance — mathematical, statistical, and epidemiological research — for risk assessment and applied toxicology research. Dr. Arthur Upton, former Director of the NCI, characterizes Dr. Rall's work in the establishment and guidance of the NTP as his greatest achievement, and states, "[T]he NTP, the only comprehensive toxicology testing program in the world, is extraordinarily important because it has created a body of toxicological data that is precious in terms of public health."

The contributions of the NIEHS and the NTP to the world community, as leaders both in the pursuit of scientific knowledge and about environmental agents and in the application of this knowledge for the protection of human health, have been invaluable. Correspondingly, Dr. Rall's role in the success of these

institutions cannot be underestimated. Dr. Bernard D. Goldstein states, "NIEHS has not only been the central focus in the United States for basic scientific research of the highest quality, it has served as a template for other countries throughout the world." [Similarly], the scope of Dr. Rall's influence on the field of environmental science extends far beyond his country's national boundaries.

Through the various activities of his career, Dr. Rall emerged as an international leader and representative of U.S. science. Dr. Rall's presence as a diplomatic negotiator has been described by Dr. Goldstein, who says, "Dave was always the most patient person in the room, and the one with the longest vision and clearest view of the implications of any decision." It is doubtless these are qualities which have served him well in his work on the many international committees and projects to which he has contributed his talents over the years. In 1965, the U.S.-Japan Cooperative Medical Sciences Panel was established. The Joint Panel on Environmental Mutagenesis and Carcinogenesis was added in 1972 and Dr. Rall was appointed to serve on the U.S. Joint Committee to the panel. According to Dr. Takashi Sugimura, president Emeritus of Japan's National Cancer Center, who served with Dr. Rall on this committee, Dr. Rall played a key role in the interaction between the American and Japanese scientific communities:

His precise and updated knowledge covering many disciplines of science related to mutagenesis and carcinogenesis impressed us, encouraged Japanese scientists, and promoted active interaction between two countries. His presence in the U.S. delegation was very helpful to us Japanese scientists, as he picked up our points very quickly and often persuaded the U.S. scientists to understand them. He was talented in finding realistic and rational solutions to satisfy everyone.

In 1972 Dr. Rall was appointed U.S. Coordinator of the Environmental Health Program as part of the U.S./U.S.S.R. Environmental Protection Agreement. It was during Dr. Rall's performance of his duties on these committees that Dr. Phillip Landrigan, currently of the Mount Sinai School of Medicine, first had the opportunity to meet Dr. Rall and observe his skill in this area firsthand. He recalls,

The very first time I met Dr. Rall he came to the Centers for Disease Control with a delegation of Russian scientists to discuss environmental health issues in our two countries, with particular emphasis on the problem of giardiasis in Leningrad. I remember that the discussion was heated with the American delegation insisting there was giardiasis in Leningrad and the Soviets denying it absolutely. My recollection of Dr. Rall at that time was that he was clearly a master in a difficult arena. He knew how to listen. He knew how to direct the conversation. He knew how to come to reasonable closure in which each side understood clearly the others' point of view.

It is because of skills such as these combined with a startling intellect and world-encompassing vision that Dr. Rall was appointed to serve as U.S. Coordinator for the U.S./U.K. Cooperative Program in Environmental Health Sciences in 1972, and also in that same year became Chairman of the Subcommittee on Environmental and Occupational Health of the Joint Working Group on Health Cooperation, as part of the U.S./Egypt Cooperative Agreement. As part of his role as a U.S. delegate on environmental matters, Dr. Rall also served as Head of the DHHS Delegation to the U.S./Japan Non-Energy Research and Development Cooperative Agreement Joint Committee Meeting in 1981. In addition, Dr. Rall guided cooperative environmental health agreements with a number of other countries including The People's Republic of China, Taiwan, Italy, Finland, and Spain.

As a result of Dr. Rall's work in attempting to strengthen international scientific cooperation in the field of environmental health, in 1975 the NIEHS was designated by the World Health Organization as a Collaborating Center for Environmental Health Effects. Then, in 1980, Dr. Rall played a leading role in a much larger international effort when he became one of the driving forces behind the establishment of the WHO's International Program on Chemical Safety (IPCS), the goals of which are to provide assessments of the risks to human health and environment by chemicals, thus providing the internationally evaluated scientific basis on which member States [of WHO] may develop their own chemical safety measures. Dr. Michel Mercier, Manager of the IPCS, recalls Dr. Rall's involvement in the formation of the program:

Dr. Rall is one of the few people who worked to establish the concept of the program. He had a strong feeling for the need for cooperation among nations in setting up the program. He promoted the concept and provided both financial and scientific assistance through the NIEHS, but he never tried to impose his views on the program. He believed in the program so he provided the funds.

Throughout the years, it has been Dr. Rall's firmly held beliefs that have guided his estimable career. And it is through this career that Dr. Rall has come to be regarded as one of the most outstanding and dedicated scientific leaders of his time. This sentiment is evidenced by the many recognitions Dr. Rall has received for his lifetime commitment to public service and scientific research. In 1975 Dr. Rall received the Distinguished Service Medal, the highest award a Public Health Service Commissioned Officer can receive, from the Department of Health, Education and Welfare, in part "in recognition for his imaginative and exemplary leadership in planning, developing, and directing the programs of the NIEHS." He was again honored with this same medal in 1990 by the Department of Health and Human Services for "sustained leadership in the development of the field of environmental health sciences." In 1983, the Society of Toxicology presented Dr. Rall with the Arnold J. Lehman Award, an award which recognizes "individuals who have made major contributions to the control of chemical agents" through the "application of sound scientific principles to regulation and/or from research activities that have significantly influenced institution of appropriate regulator processes." Dr. Rall was honored for his contributions to the advancement of occupational safety and health, in 1991, when he received the William A. Steiger Award, which recognizes the co-author of the 1970 Occupational Safety and Health Act. By far the most important national recognition Dr. Rall has received, however, in addition to those mentioned above, was his acceptance in 1979 as a Member of the National Academy of Sciences, Institute of Medicine, whose membership consists of the nation's preeminent physicians.

Just as Dr. Rall's contributions have not been limited to national boundaries, neither has the recognition of these achievements. Dr. Rall has been commended by international organizations for his contributions to world health. In 1988 the World Health Organization (WHO) presented Dr. Rall with the "Health for all 2000" Medal, one of the highest honors the organization bestows, making him one of only five Americans to receive the award since the establishment of WHO in 1948. This award was given in recognition of Dr. Rall's outstanding scientific ac-

complishments and his support of WHO's efforts to protect the health of people worldwide. Dr. Rall was honored in 1989 by the Collegium Ramazzini, a scientific organization whose goal is the advancement of the study of occupational and environmental health around the world. The Ramazzini Award was named for the 17th century Italian physician Bernardino Ramazzini, who is generally regarded as the founder of industrial medicine, and honored Dr. Rall for his career contributions to occupational and environmental medicine. These contributions were also recognized in 1989 by the Institute of Occupational Health in Helsinki, an agency of the Finnish government, which awarded to Dr. Rall its Distinguished Service Medal.

Although the recognitions of his professional and scientific achievements have been many, just as numerous and certainly as significant have been the personal praises bestowed upon Dr. Rall by his colleagues and friends. Says Ms. Jacqueline Simon, "He has been a loyal friend and mentor through good times and bad. He's a great person to break bread with, and a source of wonderful recipes, warm hospitality, and poor jokes." Dr. Frederica Perera, Physician of Environmental Sciences at Columbia School of Public Health and a longtime friend of Dr. Rall's, draws this portrait of him: "David Rall is a beacon of intelligence, humor and integrity. Whether presiding over a meeting of a Board of Scientific Counselors, testifying on the Hill, hosting the U.S.-Japan Biomedical Committee, or searching for smoked eels in a Japanese food shop, he is the same articulate, wise person." On a more personal note, Mr. George Watts Hill, Jr., a lifelong friend of Dr. Rall's whose father played a major roll in the establishment of the Research Triangle Institute and Foundation and who was of significant help to Dr. Rall in obtaining the congressional support needed to fund the Institute, speaks of Dr. Rall in this way, "There are others who will speak about Dave as an exceptional administrator and scientist. To me Dave has been an exceptional friend." Truly, exceptional seems to be the word that best characterizes both the individual and the career of Dr. David Rall. As a scientist, administrator, and diplomat, Dr. Rall has been a pioneer in the establishment of the field of environmental health sciences. As an intellectual and aggressive activist, he has educated scientists, governments, and the world community to the critical need to address the existence of environmental agents and their consequences for human health. As a leader he has marshalled some of the best minds and hearts of his time to the cause of world health through a safe and clean environment. And finally, as visionary he has provided the goals of environmental health sciences and the direction to guide both current and future generations. Dr. Donald Frederickson expresses it best, perhaps, when he says of Dr. Rall, "He has earned a place in the pantheons, not only that of the NIH and all the academic institutions that comprise its universe, but among the scientists who have fought hard for the only planet we share." It is for this reason that we dedicate Volume 100 of *Environmental Health Perspectives* to Dr. David P. Rall.

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